



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/551,465

08/21/2006

Masahiro Ohashi

01197.0258

4437

22852

7590

08/04/2008

FINNEGAN, HENDERSON, FARABOW, GARRETT & DUNNER  
LLP

901 NEW YORK AVENUE, NW  
WASHINGTON, DC 20001-4413

EXAMINER

PARSONS, THOMAS H

ART UNIT

PAPER NUMBER

1795

MAIL DATE

DELIVERY MODE

08/04/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/551,465	<b>Applicant(s)</b> OHASHI ET AL.	
	<b>Examiner</b> THOMAS H. PARSONS	<b>Art Unit</b> 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 21 August 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 August 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>12/13/2007; 10/03/2005</u> .                                  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Specification***

1. The disclosure is objected to because of the following informalities:  
  
page 22, line 27, suggest changing “way” to --away--.  
  
page 24, line 8, the text “...rubber put on its was set” appears awkwardly worded.  
  
Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:  
  
The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
3. Claims 6-8 and 15 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 6 recites the limitation "the average pore diameter" in line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim 7 recites the limitations "the shutdown temperature" in line 2, and “the short-circuit temperature” in line 3. There is insufficient antecedent basis for these limitations in the claim.

Claim 8 recites the limitation "the high temperature puncture strength" in 2. There is insufficient antecedent basis for this limitation in the claim.

Claim 15 recites the limitations "the shutdown temperature" in line 2, and "the short-circuit temperature" in line 3. There is insufficient antecedent basis for these limitations in the claim.

***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-3, 5, 9-11, 13, and 18-19 are rejected under 35 U.S.C. 102(b) as being anticipated by Higuchi et al. (US 5,824,430).

**Claim 1:** Higuchi et al. in Figures 1(b) and 1(c) disclose a microporous polyolefin film that comprises polyethylene and polypropylene as essential components and is composed of a laminate film of two or more layers, wherein the percentage of polypropylene blended in at least one surface layer of the film is more than 50% by weight and 95% or less and the content of polyethylene in the entire film is 50% or more and 95% or less (abstract, col. 5: 56-col. 6: 9 and col. 5: 1-6). See also entire document.

**Claim 2:** Higuchi et al. in Figure 1(b) disclose that at least one layer of the laminate film is a polyethylene single layer film (col. 4: 58-67). In particular, Higuchi et al. disclose in Figure 1(b) that layer to can be polyethylene alone, or a blend of polypropylene and polyethylene.

**Claim 3:** Higuchi et al. in Figure 1 disclose that the laminate film is made up of three layers (col. 3: 45-53).

**Claim 5:** Higuchi et al. disclose that the proportion of the thickness of the layer in which the percentage of propylene blended is more than 50% by weight and 95% or less is 1.5% or more and 35% or less of the entire film thickness (col. 3: 64-col. 4: 3 and col. 6: 11-23).

**Claim 9:** Higuchi et al. disclose a lithium-ion battery separator (col. 13: 3-15), comprising a microporous polyolefin film that comprises polyethylene and polypropylene as essential components and is composed of a laminate film of two or more layers (Figures 1(b) and 1(c), wherein the percentage of polypropylene blended in at least one surface layer of the film is more than 50% by weight and 95% or less and the content of polyethylene in the entire film is 50% or more and 95% or less (abstract, col. 5: 56-col. 6: 9 and col. 5: 1-6). See also entire document.

**Claim 10:** The rejection of claim 10 is as set forth above in claim 2.

**Claim 11:** The rejection of claim 11 is as set forth above in claim 3.

**Claim 13:** The rejection of claim 13 is as set forth above in claim 5.

**Claims 18 and 19:** Higuchi et al. in Figure 1(b) disclose that at least one layer of the laminate film is a polyethylene single layer film and the laminate film is made up of three layers. In particular, Higuchi et al. disclose in Figure 1(b) that layer to can be polyethylene alone, or a blend of polypropylene and polyethylene.

### ***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

Art Unit: 1795

having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 4, 6-8, 12, and 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Higuchi et al. (US 5,824,430) as applied to claim 1 above.

Higuchi et al. are as applied, argued, and disclosed above, and incorporated herein.

**Claim 4:** Higuchi et al. do not disclose that each of the layers that make up the laminate film has a three-dimensional network.

However, because the microporous polyolefin film of Higuchi et al. has a composition similar to, and is produced in similar fashion to that instantly disclosed (i.e. extruded, heated, stretched), it each of the layers that make up the laminate film would obviously have a three-dimensional network.

**Claim 6:** Higuchi et al. do not disclose that the average pore diameter is 0.02  $\mu\text{m}$  or more and 1  $\mu\text{m}$  or less.

However, because the microporous polyolefin film of Higuchi et al. has a composition similar to, and is produced in similar fashion to that instantly disclosed (i.e. extruded, heated, stretched), it obviously would provided the claimed average pore diameter.

**Claim 7:** Higuchi et al. do not disclose that the shutdown temperature at the time of high speed heat-up is lower than 150 °C and the short-circuit temperature at the time of high speed heat-up is 190 °C or higher.

However, because the microporous polyolefin film of Higuchi et al. has a composition similar to, and is produced in similar fashion to that instantly disclosed (i.e. extruded, heated, stretched), it obviously would provided the claimed shutdown temperature and short-circuit temperature.

Art Unit: 1795

**Claim 8:** Higuchi et al. do not disclose that the high temperature puncture strength is 0.005 N/ $\mu$ m or more.

However, because the microporous polyolefin film of Higuchi et al. has a composition similar to, and is produced in similar fashion to that instantly disclosed (i.e. extruded, heated, stretched), it obviously would provided the claimed high temperature puncture strength.

**Claim 12:** The rejection of claim 12 is as set forth above in claim 5.

**Claim 14:** The rejection of claim 14 is as set forth above in claim 6.

**Claim 15:** The rejection of claim 15 is as set forth above in claim 7.

**Claim 16:** The rejection of claim 16 is as set forth above in claim 8.

### ***Claim Rejections - 35 USC § 102***

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

### ***Claim Rejections - 35 USC § 103***

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claim 17 is rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Higuchi et al. (US 5,824,430).

**Claim 17:** Higuchi et al. in Figure 1 disclose a lithium-ion battery separator (col. 13: 3-15) comprising a microporous polyolefin film but does not disclose that the film has a degree of blackening of 5% or less.

However, because the microporous polyolefin film of Higuchi et al. has the *same* composition as, and is produced in the *same* manner as that instantly disclosed (i.e. extruded, heated, stretched), it inherently would provided the claimed degree of blackening.

Or, in the alternative, because the microporous polyolefin film of Higuchi et al. has a composition *similar* to, and is produced in *similar* fashion to that instantly disclosed (i.e. extruded, heated, stretched), it obviously would provided the claimed degree of blackening.

---

***Claim Rejections - 35 USC § 102***

11. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

12. Claims 1, 3, 5-6, 9, 11, and 13-14 are rejected under 35 U.S.C. 102(b) as being anticipated by Nishiyama et al. (US 5,731,074).

**Claim 1:** Nishiyama et al. disclose a microporous polyolefin film that comprises polyethylene and polypropylene as essential components and is composed of a laminate film of two or more layers (abstract), wherein the percentage of polypropylene blended in at least one surface layer of the film is more than 50% by weight and 95% or less and the content of



Art Unit: 1795

polyethylene in the entire film is 50% or more and 95% or less (col. 3: 33-47). See also entire document.

**Claim 3:** Nishiyama et al. disclose that the laminate film is made up of three layers (abstract).

**Claim 5:** Nishiyama et al. disclose that the thickness of the layer in which the percentage of propylene blended is more than 50% by weight and 95% or less is 1.5% or more and 35% or less of the entire film thickness. In particular, Nishiyama et al. disclose 17% (col. 6: 22-26).

**Claim 6:** Nishiyama et al. disclose that the the average pore diameter is 0.02  $\mu\text{m}$  or more and 1  $\mu\text{m}$  or less (col. 6: 25-26, and 47-48, and col. 4: 12-14).

**Claim 9:** Nishiyama et al. disclose a lithium-ion battery separator (col. 1: 14-col. 2: 56), comprising a microporous polyolefin film that comprises polyethylene and polypropylene as essential components and is composed of a laminate film of two or more layers (abstract), wherein the percentage of polypropylene blended in at least one surface layer of the film is more than 50% by weight and 95% or less and the content of polyethylene in the entire film is 50% or more and 95% or less (col. 3: 33-47). See also entire document.

**Claim 11:** The rejection of claim 11 is as set forth above in claim 3.

**Claim 13:** The rejection of claim 13 is as set forth above in claim 5.

**Claim 14:** The rejection of claim 14 is as set forth above in claim 6.

### ***Claim Rejections - 35 USC § 103***

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

Art Unit: 1795

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

14. Claims 4, 7-8, 12, and 15-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nishiyama et al. as applied to claim 1 above.

**Claim 4:** Nishiyama et al. do not disclose that each of the layers that make up the laminate film has a three-dimensional network.

However, because the microporous polyolefin film of Higuchi et al. has a composition similar to, and is produced in similar fashion to that instantly disclosed (i.e. extruded, heated, stretched), it each of the layers that make up the laminate film would obviously have a three-dimensional network.

**Claim 7:** Nishiyama et al. do not disclose that the shutdown temperature at the time of high speed heat-up is lower than 150 °C and the short-circuit temperature at the time of high speed heat-up is 190 °C or higher.

However, because the microporous polyolefin film of Higuchi et al. has a composition similar to, and is produced in similar fashion to that instantly disclosed (i.e. extruded, heated, stretched), it obviously would provided the claimed shutdown temperature and short-circuit temperature.

**Claim 8:** Nishiyama et al. do not disclose that the high temperature puncture strength is 0.005 N/μm or more.

However, because the microporous polyolefin film of Higuchi et al. has a composition similar to, and is produced in similar fashion to that instantly disclosed (i.e. extruded, heated, stretched), it obviously would provided the claimed high temperature puncture strength.

Art Unit: 1795

**Claim 12:** The rejection of claim 12 is as set forth above in claim 4.

**Claim 15:** The rejection of claim 15 is as set forth above in claim 7.

**Claim 16:** The rejection of claim 16 is as set forth above in claim 8.

***Claim Rejections - 35 USC § 102***

15. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

***Claim Rejections - 35 USC § 103***

16. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

17. Claim 17 is rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Nishiyama et al. (US 5,731,074)

**Claim 17:** Nishiyama et al. disclose a lithium-ion battery separator (col. 1: 14-col. 2: 56) comprising a microporous polyolefin film but does not disclose that the film has a degree of blackening of 5% or less (see entire document).

However, because the microporous polyolefin film of Nishiyama et al. has the *same* composition as, and is produced in the *same* manner as that instantly disclosed (i.e. extruded, heated, stretched), it inherently would provided the claimed degree of blackening.

Art Unit: 1795

Or, in the alternative, because the microporous polyolefin film of Nishiyama et al. has a composition *similar* to, and is produced in *similar* fashion to that instantly disclosed (i.e. extruded, heated, stretched), it obviously would provided the claimed degree of blackening.

18. Claims 2, 10, 18-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nishiyama et al. (US 5,731,074) as applied to claims 1 and 9 above, and further in view of Higuchi et al. (US 5,824,430).

Nishiyama et al. are as applied, argued, and disclosed above, and incorporated herein.

**Claims 2 and 10:** Nishiyama al. do not disclose that at least one layer of the laminate film is a polyethylene single layer film.

Like Nishiyama et al., Higuchi et al. in Figure 1(c) disclose a microporous polyolefin film of a laminate structure comprising a porous inner layer of a blend of polyethylene and polypropylene, and having formed on both side surfaces thereof a porous outer layer of polypropylene. However, Higuchi et al. disclose a laminate structure comprising a porous inner layer of polypropylene, and having formed on both surfaces thereof a porous outer layer wherein one layer can be a blend of polyethylene and polypropylene, and another can be a polyethylene single layer film (col. 5: 56-col. 6: 9 and col. 4: 58-67).

**Claims 18-19:** Nishiyama et al. disclose that the laminate film is made up of three layers but does not disclose that at least one layer of the laminate film is a polyethylene single layer film.

Like Nishiyama et al., Higuchi et al. in Figure 1(c) disclose a microporous polyolefin film of a laminate structure comprising a porous inner layer of a blend of polyethylene and

Art Unit: 1795

polypropylene, and having formed on both side surfaces thereof a porous outer layer of polypropylene (a three layer laminate structure). However, Higuchi et al. disclose a laminate structure comprising a porous inner layer of polypropylene, and having formed on both surfaces thereof a porous outer layer wherein one layer can be a blend of polyethylene and polypropylene, and another can be a polyethylene single layer film (col. 5: 56-col. 6: 9 and col. 4: 58-67).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have substituted the laminate of Nishiyama et al. with the laminate of Higuchi et al. because Higuchi et al. teach a three layer laminate structure wherein at least one layer of the laminate film is a polyethylene single layer film that would have provided a battery separator having a low electrical resistance at normal time, a high mechanical strength and good shut-down characteristic thereby improving the overall life and performance of the battery.

### *Examiner Correspondence*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to THOMAS H. PARSONS whose telephone number is (571)272-1290. The examiner can normally be reached on M-F (7:00-3:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1795

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/PATRICK RYAN/  
Supervisory Patent Examiner, Art Unit 1795

Thomas H Parsons  
Examiner  
Art Unit 1795

\*\*\*